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IN TWO SECTIONS

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EDITORIAL DEPARTMENT NOTE

The Bulletin for May 15 contained two articles dealing with the problems of cost accounting and control for motor vehicles. In this issue two additional articles on this subject are presented. These articles describe two systems used for accounting for and controlling the costs of operating delivery trucks. Readers will be interested in noting the respects in which the two plans described differ, as well as their similarities. Problems of principle as well as procedure are involved, and the way in which these problems are solved may have an important bearing on numerous management decisions.

The author of our first article is Gerald Torrence, who is Vice-President and also Secretary-Treasurer of the Schulze Baking Co., and Secretary and Treasurer of the Interstate Bakeries Corp., both of Kansas City, Mo. Mr. Torrence received his academic training at Iowa Wesleyan University and professional training at the School of Commerce, Accounts and Finance of Denver University. His broad experience has been obtained in a variety of fields, including construction, banking, box manufacture, and public accounting. From 1918 to 1922 he was with the Springfield, Mass., office of Scovell Wellington & Co., where he became Resident Manager. Then followed three years each with Tait Bros., Inc., and Eastern Dairies, Inc., as Controller in both cases. In 1928, Mr. Torrence assumed his present position with the Schulze Baking Co., and in 1930, on its formation, the position of Secretary and Treasurer of the Interstate Bakeries Corp. He is a Massachusetts C.P.A.

Our second article is by John D. Zerbo, who is a native Cincinnatian and was educated in the Cincinnati schools. He received the B.S. degree in Commerce from Xavier University, Cincinnati, in 1929. Since graduation Mr. Zerbo has been connected with the Strietmann Biscuit Co. of Cincinnati where he is at present Cost Accountant. Mr. Zerbo is Secretary of our Cincinnati Chapter.

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JUNE 1, 1937

ACCOUNTING FOR TRUCK OPERATIONS

By Gerald A. Torrence, Secretary-Treasurer, Schulze Baking Co., Kansas City, Mo.

IT IS TRITE but true that a major problem in most businesses is the cost of distribution. In many of them a large part of the cost of distribution is in the cost of mechanical delivery, ordinarily by means of automobile trucks. The following is a description of the methods used by a wholesale baking company to obtain the information required to control truck costs. While some other companies may go into greater detail, our system has proven thoroughly practical and, in our opinion, is sufficient for our needs.

Problem Stated

Our fleet, serving customers on more than five hundred delivery routes, consists of over six hundred auto trucks operating in thirteen states. Nearly one-fourth are in cake service, chiefly ½-ton trucks, and the remainder are mostly 1½-ton trucks in bread service, with the exception of twenty-five trucks and cars in miscellaneous service. Our nine plants are located in Chicago (two plants), Kansas City, Cincinnati, Omaha, Des Moines, Grand Rapids, Peoria, and Springfield, Ill.

As far as possible a truck is kept on the same route. This serves as a check on the care exercised by the driver, keeps the mileage on that truck nearly constant, and simplifies the cost and performance follow-up. However, there are several times during the year in the normal course of events when another truck is substituted—for overhauling and painting, for instance. For these reasons, and to take care of rush business such as before holidays, we have to maintain a number of "spare trucks." The normal ratio is one "spare truck" to nine in service but this varies due to different conditions in different cities. In addition, we operate about twenty-five trucks and passenger cars for hauling, advertising, and sales promotion; the accounting for these trucks is on a cost-per-week basis, the rates being revised if occasion arises.

We have some other relatively minor problems, probably not necessary to detail here. One of these is transport trucks which we prefer not to own, paying for their use at an agreed-upon rate per

mile for a certain number of miles or over a specified period of time. We own a few trucks that are loaned to distributors in rural areas, the distributor providing his own upkeep and operating expenses. We are chiefly concerned with depreciation charges, which in these cases do not enter into truck costs but rather into distribution costs.

All of the plants of this company are in cities of sufficient size so that we find it practicable to keep on hand small, even meager, stocks of repair parts, tires, tubes, batteries, etc. The average inventory during 1936 totalled only $4,250. In several cities we find satisfactory tire service which eliminates carrying spares on the trucks; this not only means a twenty per cent smaller investment in tires but considerably less tire expense because tires continually carried as spares deteriorate faster than those in use on the wheels. These facts are of importance in the accounting as well as in the cost, for it is much easier to account for vouchered purchases than for withdrawals from inventory, and we greatly reduce any difficulty with inventory reconciliations.

In accounting for truck expense we have in use nine forms, as follows:

A-1	Daily Truck Record
A-2	Daily Gas and Oil Used
A-4	Garage and Truck Supply Requisition
A-5	Recapitulation of Daily Truck Record
A-6	Auto Recapitulation
A-7	Inventory Control Statement
A-8	Report of Changes in Fleet
#100	Repair Order
#518	Material Receiving Report

Samples of Forms A-1, A-2, A-5, A-6, and A-7 will be found at the end of this article. There is also furnished a chart of accounts keyed to Form A-6.

Description of Forms Illustrated

Form A-1: Daily Truck Record and Salesman's Daily Report. This form is required to be made out daily. The salesman fills out one side of the card only. Since the garage makes out the reverse, this becomes the office record which is checked with the payroll for labor and with invoices or inventory for materials used, and

with Form A-2 for gas and oil consumption. These cards are filed by truck numbers by dates; they are transferred to storage at the close of each quarter or whenever the accumulation necessitates.

Form A-2: Daily Gas and Oil Record. This sheet is clipped to a board and is hung by the gas pump. The amount of gas taken is recorded as the trucks are served. Either this sheet or one similar to it is used for the record of oil served. The data from this sheet and from Form A-1 are posted to Form A-5.

Form A-5: Recapitulation of Daily Truck Record. One of these sheets is made out in duplicate for each truck each month (four-week accounting period), and each line is filled out each day. It will be noted from the sample furnished that the garage foreman, plant manager, or chief engineer, by studying this form or a number of them for several months past, may readily follow the truck's performance as to cost of repairs and all other items of expense. This also shows how often washing and greasing is done, either by days or according to mileage. Gas and oil consumption can be figured any time almost at sight against the mileage in the final column. Several of these columns are combined in posting the total for the period to Form A-6. Each plant office is provided with a manual giving detailed instructions as to disposition of charges and posting to A-6. These sheets are filed by trucks for the life of the truck, the original in the general office and the duplicate in the plant office.

Form A-6 is used by the general office in three ways: (1) The sample furnished indicates how this is used as a life history for each truck. The monthly totals from Form A-5 are posted to one line in each of the columns from A to Q, and the columns R, S, and T are completed. The plant keeps a similar history. (2) The same information is posted to a sheet of this form showing on successive lines the period cost of each of the trucks in one plant for an accounting period—a recapitulation of the individual A-6 records. (3) The general office makes up a similar sheet each period showing the total for all of the trucks in the whole fleet, one line per plant, and a total. Photostatic copies are furnished the executives interested.

You will note that on this form, Column S provides for the number of weeks. For some purposes we calculate the cost per week to operate trucks, but this varies widely between plants and is

chiefly useful as additional or corroborative data. Special duty trucks are costed on the weekly basis.

Form A-7: Inventory Control Statement. This report comprises nine pages. Pages 1 and 2 illustrated here are representative of the other pages. Separate statements (two to a page) are made of each of the several accounts listed on page 1. These reports are filled out in detail and sent to the general office at the close of each four-week period by each plant accompanied by supporting schedules showing all details of the closing inventories. The preparation of these statements automatically discloses any unaccounted for inventory and affords an opportunity for the plant office to make any necessary corrections before releasing the report. Without this form of perpetual inventory there would doubtless be much variance due not so much to unaccounted for usage of materials as to over-lapping bills. If differences are to be avoided the general office must take up into its accounts precisely the same items of purchases used by the plants. These statements make that possible and thereby overlapping bills are avoided.

Description of Forms Not Illustrated

Form A-4 is an ordinary requisition form made out by the garage foreman and delivered to the vendor, with a copy to the plant office for the checking of invoices.

Form A-8 is used by the general office at the close of each accounting period to report to the insurance carrier any changes—additions or deductions—in the number of trucks in service and their value, by locations.

Form 100 is a repair order made out by the chief engineer authorizing special repairs, overhauls, motor substitutions or other major operations. These are kept on file for future reference and act only as authorizations.

Form 518 is a conventional material receiving report form, made out by the garage foreman and sent to the plant office for checking of repair parts, tires, tubes, etc., to invoices. The report shows whether the goods are for stock or for a specific truck.

Garage Labor

All of the labor in the garage is considered repair labor, as the greater part of such wages must be spent on the upkeep of vehicles.

The time of the working foreman and of the garage employees is so nearly completely charged to individual trucks that the difference between the payroll and those charges for all of the plants exceeded $100 in a four-week period only four times during 1936, the highest difference being $166 in one such period. The average rate per hour of foremen and employees is used in costing, except in the larger garages where two or three such averages are used. There are sixty-one garage employees including foremen.

Garage Burden

This comprises supplies for general use in the garage such as wiping waste, brooms, gasoline and oil withdrawn for general use, and maintenance of garage buildings and garage equipment, plus any unaccounted for amounts as reported in the nine A-7 sheets. The importance, if not necessity, of requiring reports on these nine sheets is evidenced by the fact that through their use the total "unaccounted" for differences on repair labor, repair parts, tires and tubes, miscellaneous outside charges, gasoline and oil did not exceed $150 in any one four-week period for all of the plants during 1936, which indicates the degree of completeness and accuracy with which these items have been charged to individual trucks.

Miscellaneous Outside Charges

These arise from account 426 which includes battery repairs and recharging; rent on sub-station garages; car washing; towing charges; and similar costs arising chiefly from trucks that operate outside of the metropolitan area at each of the cities where plants are located.

Tires and Tubes

Some operators of fleets would not be without a detailed record of each tire. This record gives the serial number of the tire, the date placed in use, the number of the truck, the wheel upon which placed, transfers to other wheels, and a record of repairs together with complete mileage data by wheels. In our own experience, even where we own the tires, our cost of tires and tubes compares so favorably with the cost of those who keep a detailed tire record that we have felt the additional labor and expense involved, including increased supervision, would not be profitable, but it is a matter worthy of thorough consideration.

In one of the large cities we do not own the tires but rent them. This we find satisfactory because the owner of the tires has to see to it that the tire pressures are checked regularly—frequently daily—that the tires are changed from one wheel to another to equalize wear, that the camber and alignment are checked, and that cuts, stone bruises, etc., are taken care of at once. Rental cost of tires is charged to the same account as are tires and tubes purchased.

Gasoline and Oil

No tolerance is allowed for spillage of gasoline and oil, or for evaporation of gasoline. This may lead to minor falsification of charges to trucks, but in our experience this is preferable to making a one or two per cent allowance. If either of these is being diverted to personal use and the charge is being made to a truck or trucks, if not otherwise discovered, a study of the miles run per gallon of gas or quart of oil sooner or later will disclose this state of affairs. All gasoline and oil is measured into the tanks and metered out at the pumps; these meter records are checked daily by the plant office. Gas and oil withdrawn for general garage use is so entered on Form A-2. No individual is permitted to obtain gasoline or oil from a company garage for his own use. Fortunately the number of company passenger cars is small, enabling us to watch them readily for excess mileage or excess costs. All bills are checked for price in the general office.

Sundry Charges

Sundry charges consist of grease (material only), repairs to bodies (own material), repairs to bodies (done outside), painting bodies (own material), and painting bodies (done outside). The sum of these foregoing items—A to H inclusive on Form A-6—we call "total operations costs," as these are all under the control of the garage foreman and his plant manager.

In our experience, nearly eighty per cent of the total direct costs of operation per mile is for labor, for repair parts, and for gasoline. The two former together in 1936 just equalled the cost of gasoline.

Depreciation Problems

Depreciation is calculated at one cent per mile but with a minimum of two per cent per period, which is twenty-six per cent

per year. This of course is calculated on the individual truck and the basis is the delivered cost of the truck ready to run including chassis, body, shelving, and tires. Over two-thirds of the fleet in our company is made up of 1½ ton trucks and ½ ton trucks of the same make; however, in former years when we had several other makes of trucks in service, varying from ½ ton to 2½ tons, we found the one cent a mile approximately correct for depreciation purposes on all trucks. When considering the replacing of a truck, the decision is based on: (a) its present and probable future cost of upkeep, which involves investigating its mechanical condition; (b) its appearance; (c) and the practicability of diverting it, for instance, from a long country route to a short city route, where it can be serviced in a hurry if necessary. The general theory is that when a truck is seventy-eight per cent depreciated it can be replaced profitably, but there are many exceptions in practice. Two identical trucks put into service at the same plant on the same day may develop quite different histories due to the territory covered, the type of driver, wrecks, and such things as a broken bearing, lost oil, or a leaky radiator causing damage which, while rectified by repairs, may permanently decrease the efficiency of the motor. Ordinarily the measure of the depreciation charges at any time can readily be determined by reference to Column R in Form A-6.

Other Fixed Charges

Other Fixed Charges consist of: auto licenses, insurance, depreciation on garage building, machinery and equipment, administrative salaries and expense (share), and rent of main plant garage owned by others. The sum of all these costs is the *Total Cost*. Each four weeks the number of miles run for that period and for the life of the truck to that date is shown on Form A-6. The number of weeks for which the truck has been in service and the cumulative operating costs since purchase are also indicated. From these data the cost performance of any one truck can be compared with the others in that plant or in the whole fleet.

Column K, Accident Repairs, Form A-6, is a memorandum only. Repairs occasioned by accidents are included in Columns A and B as part of the normal operating expense. This record of accident repairs, however, is of constant use in working with

managers, supervisors, and drivers in safety work. Where conditions permit, we assess drivers with at least a part of the cost of accidents which are the result of their failures, and any reimbursement thus received is a credit to the charge originally made.

Basis for Measuring Efficiency

It is our practice to use costs per mile, although there are good reasons why other bases might also be used. It is obvious that the more miles a truck runs per year or week, the less is the cost per mile for fixed and overhead charges; to determine differences definitely, a study was made covering a five-year period, from which it was determined that in a plant where the average total cost per mile of all of the trucks in that plant was, let us say, 4.6 cents, the cost on routes of different lengths in that plant was as follows:

From	0	to	100	miles—	10.5¢	per mile
From	101	to	200	miles—	6.4¢	per mile
From	201	to	300	miles—	5.2¢	per mile
From	301	to	400	miles—	4.0¢	per mile
Over			400	miles—	3.8¢	per mile

These rates are not quite the same in any two plants, but this is typical of all. These data are of considerable importance from many angles. One important use to which we put them is in our weekly calculations of profit or loss on each individual route, in which truck cost is an important factor, not only because of the dollars and cents involved, but in a determination of what is required to improve the results through extending or shortening routes, combining routes, etc. We have a number of routes which operate over 1,000 miles a week each, while on the other hand, many city routes operate less than 100 miles a week each; it is evident that applying the same average to both cases is incorrect and definitely misleading.

A plan used by some companies and which has considerable merit, is that of controlling truck operations on a cost per hour basis. This is used particularly by some large bus operating and other public utility companies. Many repair trucks, for instance, show a low mileage but are away from the garage the average num-

ber of hours. Their longest days are frequently under the worst climatic, and consequently, cost conditions. Some of them carry winches, etc., driven by the automobile motor, and in these cases the cost per mile is practically meaningless. A few years ago it was demonstrated to the satisfaction of all concerned that, with a fleet of several hundred ice cream delivery trucks of various makes and capacities operating in flat country, hilly country, congested city districts, and small towns and rural districts, the cost per hour of operation of two similar units was practically the same regardless of the territory. I have experimented with a passenger car, setting the hand throttle to attain a speed of exactly twenty-five miles per hour on the level, leaving the throttle at that point, then taking it through hilly country free from congested traffic. I found that the maximum downhill speed was thirty-two miles per hour and the minimum uphill speed eighteen miles per hour, or an average of twenty-five miles per hour, and that in a two-hour run, exactly fifty miles had been covered.

The mileage per gallon of gas is about the same under varying conditions; the motor attains its maximum efficiency of gas consumption at somewhere between twenty-five and forty miles per hour, so the longer haul on country routes is offset by the idling and the low-geared travel of city route trucks; two similar trucks in country service—one on level ground and the other on the hills—will have approximately the same gasoline consumption per mile, for whatever goes up must come down and the increased consumption of gas uphill is offset by the decrease when going downhill.

The much greater distance between stops in country territory, with a higher average traveling speed but with much less wear and tear on the motor, brakes, clutch, gear shift, etc., from stops, is to be compared with city driving conditions with frequent starts and stops, a much higher percentage of low-gear driving, and comparatively many sudden applications of brakes. A successful application of this principle has been made by determining the average cost per hour to operate the various types of trucks and operating the truck department as a separate division; the shipping department which was using the trucks paid the truck division established rates per hour for the number of hours the trucks were in service, and this became the truck division's income. If at the end of the year the truck division's income equalled the sum of its ex-

penses, it had done what might be called a perfect job. This not only put the truck division on its toes to meet its budget, so to speak, but the shipping department, in order to reduce its expenses and make a showing, ordered out trucks only as needed. Many trucks delivering special orders returned to the plant with nothing to do for an hour or more and were immediately sent to the garage. This afforded the garage an opportunity to make inspections and minor repairs which reduced those costs and spread the work out more evenly over the day. Effect is given, at least in part, to this method in our practice of charging a higher rate per mile on the shorter hauls.

Allocation of Various Expenses

The amount charged to a garage for its share of the interest, insurance, and taxes on the whole building of which it occupies a part, is based on the footage occupied. Workmen's compensation insurance charged to garage operations covers only the garage employees and not the drivers. Thirty per cent of the cost of automobile public liability and property damage insurance is charged to the garage and the remainder to other expense; this arbitrary distribution is on the theory that if we were self-insurers and had no accident losses it would require the amount of money represented by this thirty per cent to handle the matter in that way. A somewhat different approach, but with the same result, is to consider that if we were free from accidents in the operation of our fleet for, say, a continuous three-year period, we should be able to purchase catastrophe insurance for not more than thirty per cent of our present costs; if insurance under these accident-free conditions was to be carried, the carrier would still be at some expense for the ever present contingent and expectant liability from accidents to an amount we estimate at thirty per cent. The seventy per cent is caused by accidents as an accompaniment of selling activities. This basis having been established four or five years ago, the amount of money charged to trucks at that time has since been increased somewhat (but not ratably) as there has been an increase in the number of vehicles operated, and consequently in the premium cost, so that the amount charged at present need not necessarily be thirty per cent of the present premium cost. With our method of placing insurance, the cost may vary from year to year

as our loss experience changes, but it would cost approximately the same amount of money for the self-insurance service each year.

The cost of automobile public liability and property damage being closely related to loss experience, the full cost of this insurance expressed as an amount of money *per truck per year* is given to the chief engineer, plant managers, and garage foremen, and is used in safety work with them and with salesmen and supervisors. There are eight different rates in the eight cities in which we operate. Partly on the theory that no plant manager is directly responsible for the rates that obtain in his territory, but chiefly for purposes of simplification, we divide the total yearly cost of this insurance by the total average number of trucks and use the resulting average cost per truck per year in all the plants; otherwise those of us concerned with truck operations, delivery expense, insurance costs, safety, etc., would have to refer to a tabulation of eight amounts rather than carry in mind just one amount that applies everywhere for an entire year. This is not an accounting problem but may be interesting as a method used to foster safety work.

Fire and theft insurance (and collision insurance which is carried only on owned transport trucks) is also charged to truck operations. Local fees imposed by city ordinances are charged to selling expense.

Occasionally a motor has to be replaced early in its life. If there is a cost involved in the exchange we ordinarily absorb that in the cost of repairs, but, depending upon the circumstances, sometimes capitalize it to extend the depreciable life of the truck.

A regular inspection, governed by the mileage, is made of all trucks at stated intervals, and overhauling inspections which are thorough and detailed are made at other regular intervals.

The original capitalized cost of the trucks includes the complete paint job, except the cost of decalcomanias furnished by us and charged to advertising at that time. Repainting, whether done by ourselves or by others, is charged to truck expense; however, a standard amount for decalcomanias is charged to advertising expense, as the trucks are really traveling billboards, and while repainting is necessary to preserve the bodies, the expense charged to advertising is incurred for that purpose only.

Automobile Truck Cost Budgets

The cost per mile on routes of varying mileage having been determined, the general office notifies each plant of these rates; the plant office then arrives at the truck cost expense which is used in the period operating statements by multiplying mileage by the appropriate rates. This obviates the distortion that otherwise would arise in any accounting period in which occurred major repairs, tire replacements, body replacements, and the difference between the depreciated value of the truck and the amount received on a trade-in. Since trucks have relatively short lives as compared with most other classes of fixed assets we consider this latter difference simply an adjustment of the arbitrary depreciation based on mileage rather than a loss or gain on disposal of fixed assets.

When the books are closed each four weeks, attention is directed to whether the amounts charged into costs, as described, are greater or less than the actual expenses of the period, as these budgets are constantly either overspent or underspent. Before the amount of difference in the budgets as thus determined becomes large, a conference is held with the chief engineer and the rates may be either raised or lowed slightly—usually only ½¢ a mile or less, and sometimes only on routes of certain length—so that at no time is there an unduly large amount either overspent or underspent. There may be an exception to this last statement if a program calling for major expenditures much greater than ordinary is contemplated; usually an underspent amount of consequence is the result of having foreseen such a program and having provided for it in advance. Sometimes unusually severe weather conditions entail a more than normal expense (for gasoline, skid chains, alcohol, broken springs, etc.,) necessitating an upward revision of budgeted costs per mile. In the last period of the year final adjustment is made and nothing is carried over to the succeeding year.

Truck Accounting Clerical Expense

The general office work requires the equivalent of the full time of one comptometer clerk working forty hours per week. The "truck week" ends on Thursday, thus avoiding extra pressure in the plant office on Saturday, which is its busiest day. This also permits the general office a "headstart" of from one to two full

days on this accounting at the end of the period, before the auto clerk's attention is required on the general closing work of the period. The general office completes the period closing in four days. It requires no greater amount of work in the plant office to operate this method than another method less-detailed and certainly less well-controlled. It pays handsomely for the time spent on it and on the detailed checking continuously done in the general office, which is essential to satisfactory results.

While not directly related to truck costs, you may be interested in our method of charging each plant with its fair share of the cost of casualty insurance—workmen's compensation and automobile public liability and property damage—determined by its accident experience. We tabulate, by months the last four years' record of costs and expenses as reported to us by the insurance companies, separately for these two kinds of insurance; each month we add the reported costs of the most recent month's report and deduct the costs of the oldest month, thus determining each month a new average of the four years immediately preceding. We then calculate on this basis for each plant its percentage of the total costs and apply that percentage to the current month's cost of insurance. These kinds of insurance are ordinarily bought on the basis of a three-to-five year loss experience; this puts each plant in that position, but with the benefit of volume-buying by the general office. If a plant is so unfortunate as to have a very heavy loss in one period, say $5,000, as the result of a fatal accident, its percentage of the total cost will immediately be increased; if that plant continues thereafter with no large charges, its percentage will gradually and continuously become lower; but the increase in its cost is immediately reflected and stands out as a constant reminder to all concerned. It takes a plant four years to live down or absorb a heavy accident loss. This plan brings home a fact that is hard to impress—namely, that the company itself pays for every penny of loss caused by accidents plus, of course, the cost of supervision, the cost of claim service, and a profit to the insurer.

We trust this brief explanation may provide some of you with practical ideas with which I have been working since 1922, and which have been successful if unusually low operating costs are the criterion.

A-1 DRM 6-30 CH

DAILY RECORD—

FORM A-1

Truck No._____

AWAY FROM PLANT (See Over):

_____ Gals. Gas $_____

_____ Qts. Oil $_____

AT PLANT:

_____ Gals. Gas

_____ Qts. Oil

REPAIR LABOR

Repairman Sign Here	No. (Over)	Remarks	Hours Worked	For Office Use Only

REPAIR MATERIALS USED

FROM STOCK			OUTSIDE PURCHASES		
Quan.	Name & No. of Part	Amount	Req. No.	Description	Amount

TIRES AND TUBES USED

ODOMETER READING—NIGHT

Greased By_____

Washed by_____

1100

SALESMAN'S DAILY REPORT ON AUTOMOBILE

FORM A-1

Truck No._____ Route No._____ Date_____ 19__

This car needs attention as checked below:

Item No.	Trouble With	√	Nature of Trouble
1	Battery		
2	Body, Top, etc.		
3	Brakes		
4	Carburetor		
5	Clutch		
6	Differential		
7	Engine		
8	Fan		
9	Fenders		
10	Generator		
11	Ignition System		
12	Lights		
13	Radiator & Pump		
14	Speedometer		
15	Springs		
16	Steering		
17	Tires		
18	Transmission		
19			
20			
21			
22			

Purchased on Route

_____ $

_____ Gals. Gas $_____

_____ Qts. Oil $_____

Salesman

GAS METER READING FORM A-2

DAILY GAS AND OIL RECORD

OIL METER READING

A. M.__________ Date__________ A. M.__________

P. M.__________ Gals. Used__________ Gals. Used__________ P. M.__________

TRUCK NO.	GAS - GALS.	OIL - QTS.	Route No.	Speedometer Reading -	TRUCK NO.	GAS - GALS.	OIL - QTS.	Route No.	Speedometer Reading
TOTALS									

[illegible]

FORM A-5

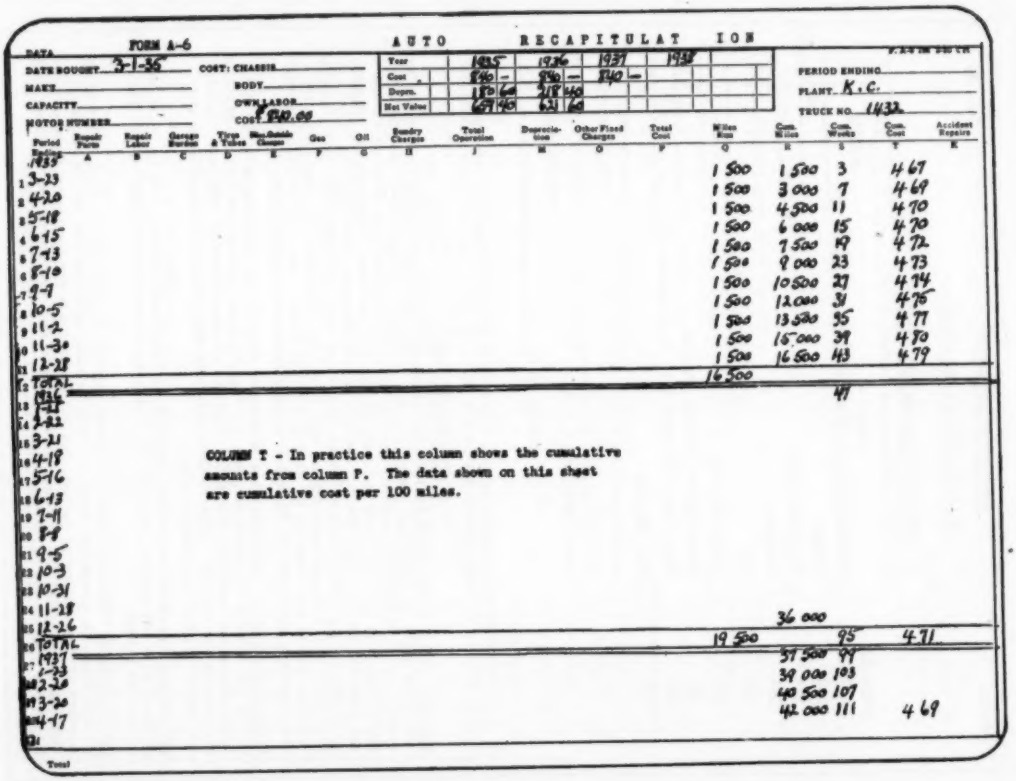
RECAPITULATION OF DAILY TRUCK RECORD STOCK

PLANT K. C.

FOR THE 4 WEEKS ENDING April 27, 1937 TRUCK NO. 1611

Day	Gasoline & Lubricating Oil & Grease	Shellubric & Gumolene	Texaco Regulo	Tires & Tubes	Wash	Gasoline Used At Plant Gals.	Gasoline Used At Plant Amt.	Gasoline Used Outside Gals.	Gasoline Used Outside Amt.	Oil Used At Plant Qts.	Oil Used At Plant Amt.	Oil Used Outside Qts.	Oil Used Outside Amt.	Brakes Used Lbs.	Brakes Used Amt.	Repairs to Bodies Own Labor	Repairs to Bodies Own Material	Repairs to Bodies Outside Charges	Painting Own Labor	Painting Own Material	Painting Outside Charges	Miles
Account No.	410	411	412	413	414		415				416			417		420	421	422	423	424	425	
Product—GP	A	Qts.	$ Amt.	Gls.	$ Amt.	G				7		7		0	1	0							
1 3/22										10												100
2 23										10												102
3 24	5 27			34	1 87					10				6	1 08			7 50	1 50	3 -	Accidents	97
4 25										10												98
5 26										9												100
6 27		3	1 50							5						3	75					101
7	5 27	5	1 50	34	1 87					54	8 10			6	1 08	5	75	7 50	1 50	3 -		799
8 28						30	87			10												102
9 30										10												101
10 31										20												200
11 4/1										5												101
12 2										10												104
13 3										10												100
14						30	87			53	8 25											401
15 5	2 50	2	1 -							30		10	3 00	6	1 08							103
16 6										10												98
17 7								1	85	10												102
18 8										10												100
19 9										5												100
20 10										20												100
21	2 50	2	1 -					1	85	75	8 25	30	3 00	6	1 08							600
22		3	1 50							10						3	75					97
23										10												100
24		2	1 00							10												102
25										9												98
26										5				6	1 08							98
27										10												100
		5	2 50							54	8 10			6	1 08	3	75					597
Total	5 27	20	8 00	34	1 87	30	87	1	85	318	32 70	30	3 00	30	5 40	5	1 50	7 50	1 50	3 00		1,397
Odometer	2 50									13	2 50			192	Miles							
	7 77									341	34			198	Gls.							

* Fractional gas took on road.



DATA FORM A-6 AUTO RECAPITULATION

DATE BOUGHT 3-1-36 COST: CHASSIS
MAKE BODY
CAPACITY OWN LABOR
MOTOR NUMBER COST $140.00

	Year	Cost	Depre.	Net Value
	1935	840 —	196 60	643 40
	1936	840 —	378 40	621 60
	1937	840 —		
	1938			

PERIOD ENDING
PLANT K. C.
TRUCK NO. 1432

Period Ending 1937	Repair Parts A	Repair Labor B	Garage Burden C	Tires & Tubes D	Misc. Chassis Charges E	Gas F	Oil G	Sundry Charges H	Total Operation I	Depreciation M	Other Fixed Charges O	Total Cost P	Miles Run Q	Cum. Miles R	Cum. Weeks S	Cum. Cost T	Accident Repairs K
1 3-23													1 500	1 500	3	4 67	
2 4-20													1 500	3 000	7	4 69	
3 5-18													1 500	4 500	11	4 70	
4 6-15													1 500	6 000	15	4 70	
5 7-13													1 500	7 500	19	4 72	
6 8-10													1 500	9 000	23	4 73	
7 9-7													1 500	10 500	27	4 74	
8 10-5													1 500	12 000	31	4 75	
9 11-2													1 500	13 500	35	4 77	
10 11-30													1 500	15 000	39	4 80	
11 12-28													1 500	16 500	43	4 79	
12 TOTAL 1936													16 500		41		
13 1-25																	
14 2-22																	
15 3-21																	
16 4-18																	
17 5-16																	
18 6-13																	
19 7-11																	
20 8-8																	
21 9-5																	
22 10-3																	
23 10-31																	
24 11-28																	
25 12-26														36 000			
26 TOTAL 1937													19 500		95	4 71	
27 1-23														57 500	99		
28 2-20														39 000	103		
29 3-20														40 500	107		
30 4-17														42 000	111	4 69	
31																	
Total																	

COLUMN T - In practice this column shows the cumulative amounts from column P. The data shown on this sheet are cumulative cost per 100 miles.

Form A-7 AUTOMOBILE ACCOUNTING Page #1

INVENTORY CONTROL STATEMENT

_____ Plant

RECAPITULATION OF INVENTORIES

For the 4 weeks ended (actual date) _____ 193__

Acct. No.	Name	Amount
401	Garage Labor (includes work in process)	$.
402	Grease	
411	Tires and Tubes	
413	Gasoline	
414	Oil	
416	Truck Supplies	
426	Miscellaneous Outside Charges	
429	Paint Shop (Includes work in process)	
428	Body Repairs	
	TOTAL INVENTORIES	

Signed by _____

In addition to this statement you are to furnish also the usual form of reports showing details of each inventory by units, prices, etc.

GENERAL INSTRUCTIONS

OVERLAPS. This system of accounting for truck operations contemplates that all expenditures shall be accounted for by charges to the individual trucks in the A-5 reports. It is therefore required that no expenditures shall be taken up in the books which have not also been included in the A-5 postings. For example, if you take inventories and close the A-5 reports on the Thursday preceding the close of the fiscal period, you should withhold as part of your fund any petty cash disbursements made on Friday and Saturday of that week, and likewise hold over until the following period all items to be paid by voucher check. You will readily see that this procedure will prevent variances arising from overlapping bills.

DETAIL OF PURCHASES. Although this summary of inventories provides no space for showing the details of purchases, you are nevertheless required to furnish itemized statements of all purchases for which vouchers or memo invoices have been issued. Use separate reports for these statements but as many different accounts as possible may be listed on a single sheet.

PETTY CASH. The petty cash items included in these reports should be in absolute agreement with the amounts reported in Form 1315 E (part of the cash report) for the current period.

WORK IN PROCESS. Wherever Work in Process appears as part of the closing inventory, although shown as a separate item, it must be considered as part of the beginning inventory of the succeeding period, but not necessarily appear on the statement as a separate item; that is, physical inventory and work in process may be consolidated into one item as the beginning inventory.

Form A-7 AUTOMOBILE ACCOUNTING page #2

_____Plant INVENTORY CONTROL STATEMENT

For the ___ Period, taken on (actual date)_____193__

401 LABOR

Beginning Inventory	$		
Add: Expenditures from Payroll			
" " Petty Cash			
" by Vouchers			
_____			
TOTAL TO BE ACCOUNTED FOR			
Charged out on A-5 (including painting labor)			
Work in Process			
Closing Inventory (actual)			
TOTAL ACCOUNTED FOR			
UNACCOUNTED FOR			

(The closing inventory of labor should include that amount accrued between the inventory date and the end of the week. For example, if you close the A-5 on Thursday, the payroll for Friday and Saturday (estimated if necessary) would constitute the closing inventory and, conversely, the beginning inventory of the following period.) (See remarks also under 429.)

402 GREASE (At Plant)

Beginning Inventory			
Add: Purchases by			
Vouchers			
Petty Cash			
Memo Invoices			
_____			
TOTAL TO BE ACCOUNTED FOR			
Charged out on A-5			
_____			
Closing Inventory			
TOTAL ACCOUNTED FOR			
UNACCOUNTED FOR			

CHART OF MOTOR VEHICLE OPERATING ACCOUNTS

		Symbol on Form A-6
401	Garage Labor	B
402	Grease—Material Only	H
403	Garage Rent (Main Plant Garage)	O
408	Garage Supplies	C
411	Tire & Tube Purchases and Repairs	D
413	Gasoline	F
414	Oil	G
415		
416	Truck Supplies (including motor and chassis parts; also repairs done outside)	A
417	Licenses	O
419	Depreciation on Trucks and Bodies	M
420	Insurance	O
423	Maintenance of Garage Buildings, Machinery and Equipment	C
424	Depreciation on Garage Buildings, Machinery and Equipment	O
426	Miscellaneous outside Charges (Including Suburban Garage Rentals) and Battery Repairs	E
427	Repairs to Bodies—Own Material	H
428	Repairs to Bodies—Done Outside	H
429	Painting Bodies—Own Material	H
430	Painting Bodies—Done Outside	H
431	Gain or Loss on Disposal of Automotive Vehicles	M*
432		
433	Proportion of Administrative Expense	O
434	Administrative Salaries	O
435	Overhead Charges by Paint Shop (A Credit Account)	C

* Combined with account 419 each period on Form A-6.

RECORDING THE COSTS OF TRUCK TRANSPORTATION

By John D. Zerbo, Cost Accountant,
Strietmann Biscuit Co., Cincinnati, Ohio

THE INCREASING preference of many companies for transportation by motor vehicle rather than by rail is emphasizing the need for adequate cost records. Some companies with great fleets of trucks have already found it necessary to analyze their trucking costs, but others, perhaps of smaller size, have taken no measures to determine accurate costs of trucking.

It is the purpose of this article to point out some of the factors which must be taken into consideration in establishing a cost system for motor transportation. Many such systems are unusually complex, but no attempt is made here to analyze or advocate this type. Each company with a fleet of trucks has its own peculiar problems, but it is my opinion that the most satisfactory results will be obtained if trucking costs are simplified as much as possible.

Objectives of the Cost Accountant

Before discussing some of the principal problems which should be taken into account, the ultimate objectives of the cost accountant should be kept in mind. There are four of these, which may be summarized as follows:—

(1) The cost accountant must determine the type of equipment which is most suitable for the particular business, from the standpoint of both efficient operation and economy.
(2) By comparative analyses, he must determine the efficiency of his truck drivers, tested under similar conditions.
(3) He must know when a transportation unit is ready to be discarded, for economy and efficiency of operation.
(4) Cost records are the first step in the solution of the ever-present problem of unprofitable territories.

With these major objectives in mind, the cost accountant must next review the various elements of cost entering into the operation of his fleet. As usual, these divide themselves into two groups, namely, those direct costs which may be allocated directly to a

certain unit, and the indirect costs. The latter are those which are brought about by the operation of the system as a whole, and can not be charged to individual units except by the application of some arbitrary method.

Direct Costs

In the following discussion, direct costs are considered first. The principal ones are: depreciation of trucks, and repairs to them, maintenance costs, certain kinds of taxes, insurance, washing, oil and gasoline, tires, painting, greasing, accident reserve, wages and other expenses of drivers and helpers.

Depreciation of trucks is perhaps the most complicated problem confronting the cost accountant. The reason for this is, of course, that the component parts which represent the total investment in any unit, do not wear out at the same rate of depreciation. It becomes necessary, therefore, to treat each of such parts in a separate manner. For example, the useful life of tires and paint on a truck will be less than that of the chassis. The life of the body usually is longer than that of the chassis. The total investment, consisting of chassis, body, tires and paint, should be broken down into these four elements, and each considered separate from the others.

Depreciation of Chassis

The depreciation of a chassis must depend, in large measure, upon individual experience and judgment. In the first place, it is necessary to consider the annual mileage which the unit will cover according to its fixed schedule. This is only one element, however. Other factors enter into the picture, such as resale value, new purchase price of the same kind of truck or competing models, repair costs, and obsolescence brought about by newer and more efficient models. An advantageous balance must be struck among these diverse considerations.

The estimated life of any unit should not be placed so high that general advancements in engineering technique and design will make it undesirable from the viewpoint of appearance and operating efficiency. On the other hand, the estimated period of useful life should not be set at such a low figure that the utility of the unit can not possibly be completely realized. Errors on either side are equally bad.

Constant attention to the fluctuating factors described above is necessary. Periodic checks and estimates are the only method for the correct calculation of the most economical step, and the attainment of the best operating efficiency. In one situation, however, it is possible to reduce the problem to a rough rule of thumb. This is the balance between depreciation and current repairs. The period of estimated useful life should be such that the truck will be fully depreciated on the books by the time the amount of the current repairs approximates the amount of current depreciation. This rule omits any consideration of lesser operating economy of the old unit compared with that of a newer one, but in practice that must not be omitted. Under this rule, when the current expenditures for repairs and replacements begin to approach the amount of current depreciation, it will usually be found advisable to purchase a new unit.

Depreciation of Truck Body

It will ordinarily be found that the actual useful life of the body of a unit will be longer than that of the chassis. This suggests at once, that the construction of the body should be such that a change to a new chassis will be facilitated with a minimum of effort and expense. The determination of the rate of depreciation for the body will depend upon all the relevant factors at the disposal of the cost accountant. Where he has had past experience with such bodies, his problem will probably resolve itself into an adaptation of his old estimates and records. If he has not had such previous experience, a careful adjustment of his estimates must be made from time to time.

Depreciation of Tires and Paint Cost

Tires depreciate at a rate which is dependent upon two factors, the number of miles traveled and the position of the tires upon the unit. In any event, the rate itself should be determined on a mileage basis, and the tires depreciated accordingly. Actual experience, based upon mileage, type of roads, geographical nature of the territory, and other factors encountered by the particular company, will determine the rate. Form No. 5 at the end of this article provides for the recording of the data necessary for the determination of the useful life and the rate of depreciation. This

form provides for the mileage of the unit at the time when the tire was first placed upon it, the mileage when it was taken off, the net mileage over which the tire has been used in service, and the total cost. The information should be broken down into tires and tubes; complete records of all repairs to tires and tubes should also be kept on this sheet.

Although the life of paint on the unit may be calculated with a great deal of accuracy, it may be found in practice that the estimates will be changed by considerations of neatness and cleanliness in the appearance of the equipment. However, with a minimum of actual experience in this respect, no difficulty should be encountered with the rate of depreciation of paint.

Other Direct Costs

Other direct costs applicable to a unit are less difficult of determination. Thus, taxes and insurance are prepaid items whose amount and time are definitely fixed. It remains only to charge each unit in the fleet with its proportionate amount on a monthly basis. Of course, where these two costs may be apportioned directly to any one unit, that should be done. In other cases taxes and insurance may be apportioned to the various applicable units on the same basis as the taxes and insurance were calculated by the taxing authorities and insurance companies respectively.

Repairs are separated into material and labor and classified as to whether they are body repairs or chassis repairs. Usually, the expense incurred in repairing the unit may be charged in its entirety at once, unless it is a major repair. In such case, the cost of the repair or replacement may be capitalized and depreciated over the remaining expected life of the unit, or the particular part of the unit which has been repaired.

Other expenses may be charged in the actual amount incurred by each unit. For example, washing, gasoline, and oil, are easily allocated to a definite unit. Greasing and other miscellaneous items of expense should be charged as they are incurred, to the actual unit or component part on which they have been incurred. The wages and other expenses of drivers and helpers, unless of an extraordinary character, may be handled in a similar manner.

The purchase of tires in replacement of old ones, should be handled as a deferred charge. As previously indicated, and shown

on Form No. 5, repairs to tires and tubes should be charged as they are incurred. Repainting of equipment should be recorded in the same manner as the replacement of tires; that is, the cost should be prepaid and deferred over a period of time which past experience has proven to be the normal life of the paint.

Accounting Separately for Component Parts

In the previous discussion, chassis, body and tires, have been treated at various points in separate fashion. This has been done largely because of the varying rates of depreciation applicable to each component part respectively. Because of this variance, it is advisable to first summarize as far as possible other elements of cost in relation to each of these parts. In this manner, the entire direct cost of body, chassis, and tires, respectively, may be arrived at.

The total of all of the foregoing items is the direct expense total. It may be shown on a separate cost sheet as Form No. 2, the "Individual Truck Cost Sheet." This form is useful in determining the actual direct expense total of each truck unit for analysis looking towards possible reductions in any of the items.

Indirect Expenses and Their Apportionment

Indirect expenses include all of those which it is not possible to charge directly to any individual unit. This class includes expenses applicable to the garage building and general garage equipment, such as taxes, insurance, depreciation, and repairs. Included also are water, heat, light, and power, supervisory salary, expense of repair car, and similar expenses which are necessary to the operation of the garage.

The choice of the method of apportionment of these indirect expenses to the various units must be made from past experience with the results obtained from any one of several methods. The basis of apportionment may be made by taking the number of hours in service of a unit; the number of ton-miles traveled; or the amount of revenues transported. Possibly the latter method will be found to be preferable, inasmuch as it ties up the cost of trucking with the value of the commodities transported. It should be possible, with very little effort, for the cost accountant to obtain comparative figures on the costs of truck and rail transportation.

In the operation of the cost system for motor transportation, certain forms and records will be found to be advisable or necessary. Following this article, are seven different forms for the tabulation of varied kinds of information. All of these have been taken from an actual system, and, it is believed, may be easily adapted to any kind of system in use in a particular plant.

Description of Illustrative Forms

Form No. 1 is a "New Equipment Record" with two sides. The front is adapted for all kinds of information respecting the specifications of a unit, some of which may be deleted if it is not thought necessary. On the reverse side the depreciation record of the unit may be kept. As started in previous pages, the depreciation rates for chassis, body, paint, and tires, will in all probability be different, so that it is advisable to show the depreciation rates and amounts for each of the respective component parts in different columns.

Form No. 2 is the "Individual Truck Cost Sheet," referred to above. It is kept on a monthly basis for the twelve months of the year, and analyzes the possible direct expenses applicable to the unit. A space is provided for the overhead allocated to the unit according to the chosen method of apportionment. At the bottom of the form, additional lines show other kinds of information relative to the miles traveled, gallons of gasoline consumed, and number of days in service, with other ratios using these elements as factors.

Form No. 3 is used to record daily items of expense referable to the unit truck. Its headings compared with those on the previous Form No. 2 which are capable of being broken down into daily figures. Taxes, depreciation, and insurance, are not shown on the daily record, but other items of direct cost of operations are included. The last four columns set out additional statistical information. At the end of the month the columns on Form No. 3 are totaled and the amounts are transferred to the correct line on the monthly summary on Form No. 2.

Daily reports made out by the garagemen are made on Form No. 4. The report summarizes the daily labor costs for each truck unit, the total labor cost for each truck being shown also on Form No. 3. A separate column is provided for the identification and

cost of any materials used on a truck, and an additional column for operations and remarks.

Form No. 5 is the "Tire Record" on which is placed the accumulation of statistical information respecting the tires on a specific truck. This record is useful for the determination of depreciation on the tires, and may also be used for the presentation of repair data. Depreciation figures are summarized on the reverse side of Form No. 1.

The next form, called the "Gas & Oil Report," is divided into numerous columns with a line for each day of the month and the total line at the bottom. Columns are provided for recording the gasoline in the "G" column, and oil in the "O" column. This is done for each individual unit. Each day the total gasoline and oil are totaled and the result carried to the respective daily total columns.

The daily total is deducted from the inventory record on gasoline in order to arrive at the inventory after all deductions. This inventory is checked with the supply tank of gasoline by gauging the tank. The latter is checked before and after filling in order to determine the amount placed in it at the time of the purchase of gasoline. The same procedure is adopted with respect to oil.

The last record shown is that on Form No. 7, the "Driver's Daily Report." This form may be used for the recording of driver's labor costs, trip statistics, gasoline consumption, oil usage, tire depreciation, and other information. The figures are transferred to other applicable forms.

It is hoped that the foregoing remarks together with the forms presented may be of some value in pointing out the principal considerations in any cost system on motor transportation. No attempt has been made to describe every minute detail of the system inasmuch as varying methods of truck operations call for different treatment.

FORM #1 Side A

NEW EQUIPMENT RECORD

Make ..... Number ..... Capacity ..... Model .....

Serial #..... Motor #..... Date Purchased.....

Purchased from: ..... Put in Service .....

Body—Loading H.....W.....L.....Body made by.....

Tire Size—Front.....Rear.....(Duals or singles)

Cost—Chassis ..... Body ..... Paint ..... Tires .....

Accessories ..... Total .....

Wheel Base ..... Overhaul length.....

Weight of chassis (equipped).....Body weight.....

Total weight.....Ratio weight Dist.....

Size of gas tanks.....Number of tanks.....

OTHER INFORMATION:—(List)

Form #2 INDIVIDUAL TRUCK COST SHEET

Truck #_____ Year_____

DIRECT EXPENSES:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Taxes													
Depreciation													
Insurance													
Repair Parts Chassis													
" Labor "													
Body Repairs Mat.													
" " Labor													
Washing													
Gasoline													
Oil													
Tires - Replacement													
" - Repairs													
Painting													
Grease													
Sundries													
Accident Reserve													
Drivers Wages													
" Expenses													
TOTAL DIRECT													
Overhead													
GRAND TOTAL													

Miles per gallon, total miles ÷ total gallons
Cost per mile, total cost ÷ total miles
Cost per day, total cost ÷ total days in operation
% of Operating Cost to Revenue, total cost ÷ revenue
Revenue per stop, revenue ÷ number of total stops
Ton miles, number of miles x tonnage carried
Cost per ton mile, total cost ÷ total ton miles.

Miles traveled													
Gallons Gas													
Miles per gallon													
Days in service													
Cost per mile													
" " day													
Stops													
Revenue													
% Operating cost to revenue													
Rev. per stop													
Ton miles													
Cost per ton mile													

DAILY TRUCK ACCUMULATED EXPENSES

Form #3 Month ______ Year ______ Truck # ______

Date	REPAIRS				Wash	Gas Gal.	Gas $	Oil Qts.	Oil $	Tires Rep.	Grease	Sundries	Driv. Wages	Driv Exp.	Miles	Stops	Tonnage	Revenue	
	Chas. Parts	Chas. Labor	Body Parts	Body Labor															
Total																			

Form #4 DAILY GARAGEMEN'S REPORT

Date_____

Truck #	Operator #	Time Start.	Time Fin.	Total Time	Operator's Rate	Total Labor Cost	Materials Used & Cost	Operations & Remarks

Form #5 TIRE RECORD

Truck #_____

Make & Brand No.	Date	Mileage put on wheel	Date	Mileage off wheel	Total Mileage	Cost	Remarks
							Tire
							Tube
							Repairs

Form # 6

Inventory Dept. (Gas____Gal (Oil____Qts

GAS & OIL REPORT

Month_____ Year_____

Foreman's O.K._____

Date	G	O	G	O	G	O	G	O	G	O	G	O	G	O	G	O	G	O	G	O	Daily Total G	Daily Total O	Gas Inv. Before Purchase	Gas Inv. After Purchase	Gas Purchased	Daily Gas Inv.	Daily Oil Inv.	Remarks
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4																												
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31																												
TOT.																												

Form #7

DRIVER'S DAILY REPORT

Driver's Name ..... Truck #..... Date .....

Left Garage ..... Returned to Garage ..... Delays .....

Total Time ..... Number of Trips ..... Tonnage .....

Number Stops ..... Number of Pieces ..... Gas Used.....

Oil Used.....

Speedometer Reading Out..... In ..... Mileage Traveled.....

Remarks .....

.....

.....

.....

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